Draft Vapor Intrusion Mitigation Work Plan

For

Valley Asphalt Property / South Dayton Dump & Landfill
Moraine, Ohio

Submitted to:
U.S. EPA, Region 5
Emergency Response Branch
Cincinnati, Ohio
OSC Steve Renninger

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1.0 INTRODUCTION

Bowser-Morner Inc. prepared this Vapor Intrusion (V I) Mitigation Work Plan (WP) on behalf of Valley Asphalt, Respondent to the Removal Unilateral Administrative Order (UAO) issued by U.S. EPA on March 22, 2013. This Work Plan details mitigation measures to address concentrations of volatile orga nic compounds (VOCs) and explosive gases detected in sub-slab soil vapor and indoor air in buildings owned by Valley Asphalt (Valley).

Valley's property (Site) is an approximate 10-acre parcel that is located on a portion of the South Dayton Dump and Landfill site (SDDL site) in Moraine, Ohio. The SSDL is a former industrial waste landfill that con sists of approximately 80 acres, which accepted household wastes, drums, metal turnings, f ly ash, foundry sand, demolition debris, wooden pallets, asphalt, paint, paint thinn er, oils, break fluid, asbestos, solvents, transformers, and other industrial wastes. A group of potentially Responsible Parties (PRPs) is working a project parallel to Valley's in accordance with the Administrative Settlement Agreement and Order on Consent for Remov al Action (ASAOC) with USEPA, for the SDDL site. The PRP group and their consultant, known as "others" in this report, have provided much of the information found in this Work Plan.

This Work Plan was prepared in accordance with the following documents:

United States Environmental Protection Agency (UISE PA) Vapor Intrusion Investigation Work Plan (USEPA, November 2011),

USEPA Region 5 Vapor Intrusion Guidebook (USEPA, 20 10)(USEPA Region 5 Guidance);

Ohio Environmental Protection Agency (OEPA(Sample Collection and Evaluation of Vapor Intrusion to Indoor Air Guidanc e Document, (OEPA, May 2010); and

OSWER Draft Guidance for Evaluating the Vapor Intru sion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapo r Intrusion Guidance)(USEPA, November 2002).

Bowser-Morner has also prepared this Work Plan to c omply with the substantive requirements of Ohio Administrative Code (OAC) 3745 -27-12 with respect o permanent monitoring for explosive gas in buildings location within the limits of waste. This mitigation work will be completed in accordance wit h Section 104(1)(1) of the Comprehensive Environmental, Response, Compensation and Liability Act (CERCLA), 42 U.S.C §960 (a)(1), and 40 CFR §300.415 (Removal Action) of the National Oil and Hazardous Substances Pollution Contingency Plan (NC P) to abate or eliminate the immediate threats posed to public health and/or the environment.

The project will require approximately 120 calendar days to complete. A Project Schedule, detailing milestones and task duration, is presented in Section 8.

1.1 OBJECTIVES OF THE VI MITIGATION ACTIVITY

This VI MP is intended to directly address actual o r potential releases of hazardous substances on the Site, which may pose an imminent and substantial endangerment to public health, or welfare, or the e nvironment. The VI Mitigation activity's primary objective is to design and insta ll a vapor abatement mitigation system in on-Site commercial structures impacted by subsur face gas migration, if the concentration(s) of contaminant(s) of concern (COCs) are greater than Ohio Department of Health (ODH)[1] sub-slab or indoor air screening levels and the pre sence of the COC is determined to be a result of vapor intrusion.

To achieve this objective, the following removal ac tivities will be completed at a minimum:

Develop and implement a Site Health and Safety Plan.

Conduct subsurface gas sampling (including VOCs and methane) using soil gas, sub-lab and indoor air sampling techniques.

[1] ODH Health Assessment Section provided screening levels for sub-slab and indoor air contaminants of concern in a letter dated July 6, 2012. ODH screening levels for naphthalene were provided by electronic mail (email) on September 13, 2012. Re vised ODH screening levels to correct the indoor air non-residential values for o-xylene were issued on October 9, 2012.

Installation of a sub-slab depressurization system (SSDS) or crawl space depressurization system, sealing cracks in walls and floors of the basement, and sealing drains that could be a pathway for vapor intrusion. The vapor abatement mitigation system will be designed to control levels of methane and VOCs to below ODH sub-slab and indoor air screening levels.

Develop and implement a performance sample plan to confirm that ODH screening levels are achieved for COCs following installation of on-site vapor abatement mitigation system. If ODH screening levels are not achieved within 30-days of installation, Valley will submit a Corrective Action Plan to USEPA.

Develop and implement an operations and maintenance (O&M) plan at properties where SSDSs are installed including a long term inspection and monitoring plan.

1.2 SITE DESCRIPTION

The SDDL site encompasses 1901 through 2153 Dryden Road and 2225 East River Road in Moraine, Ohio. Valley Asphalt purchased a portion of the site on May 7, 1993. For purposes of this report, the property owned by Valley will be referred to as the "Site". The Site has mailing addresses of 1901 and 1903 Dryden Road in Moraine, Ohio. The Site is an irregularly-shaped property located in the northern portion of the SDDL site. The Site is bounded to the north and west by the Miami Conservancy District (MCD) floodway, the Great Miami River Recreational Trail and the Great Miami River (GMR) beyond. The Site is bounded to the east by Dryden Road and the SDDL site with light industrial facilities and residential properties beyond. The Site is bounded entirely to the south by the SDDL site.

The Site is currently occupied by Valley's Dryden Road asphalt plant facility. Until a few years ago, Murphy's Plumbing, a "squatter" who appears to have sold and stored ceramic bathroom fixtures and other plumbing supplies on-site, occupied a small portion of the northeast corner of the Site.

Valley's project encompasses the following buildings:

Building Number	Address	Use/Description
1	1901 Dryden Road	Former office building; 1500 square feet; slab-on-grade
2	1903 Dryden Road	Bricked-front area of the building previously was used as office space; 4,888 square feet; slab-on-grade
4	1901 Dryden Road	Plant control building with basement; 280 square feet
5	1901 Dryden Road	Quality control building; 280 square feet; slab-on-grade
6	1901 Dryden Road	Pre-fab metal storage shed; 218 square feet; earthen floor
MP	Dryden Road	Former Plumbing Supply; 365 square feet; undetermined construction

The structure known as Building 7 may be partially on Valley's property and is not known to be owned by Valley.

Commercial and industrial properties bound the SSDL site to the east and south including an approximate 30-acre maintenance facility owned by Dayton Power and Light (DP&L). Additional commercial and industrial properties are located on the opposite bank of the GMR to the northeast, north, northwest west and southwest. The Montgomery County Sewage Disposal facility is located on the opposite bank of the GMR, southwest from the Site.

Approximately 25,060 people live within a 4-mile radius of the Site. Residential properties exist more than 1,500 feet (ft) north of the Site beyond the opposite bank of the GMR. Other residential properties are located at least 11,000-feet south and southeast of the Site, along Dryden and East River Roads.

A landfill operated on the approximate 80-acre SDDL site from the 1940s until 1996. Municipal, commercial, industrial and residual wastes and construction and demolition (C&D) debris were disposed of at the landfill over the years. Combustible wastes were often burned.

First leased, then purchased, Valley has operated an asphalt plant from the Site since the mid-1950s. During that time, Valley has stored raw materials, batched asphalt, and conducted quality-related testing on-site and sold driveway sealer to the public. Valley did not place waste or C&D debris in or on the landfill.

COCs indentified in the fill, waste, and soil at the SDDL site consist of the following: VOCs including but not limited to trichlorethene (TCE), cis-1,2-dichloroethene (cis, 1-2,DCE), vinyl chloride (VC) and benzene; semi-volatile organic compounds (SVOCs) including, but not limited to, polynuclear aromatic hydrocarbons (PAHs) and naphthalene; polychlorinated biphenyls (PCBs); and metals including lead, copper, arsenic and other inorganic chemicals. Contaminants, including VOCs, arsenic, lead and some other chemicals detected in the landfill, have been detected in groundwater samples collected from a number of monitoring wells at and near the SDDL site. Napthalene and VOCs, including benzene, chlorobenzene, cis-1,2-DCE, isopropyl benzene, ethylbenzene, TCE and VC were also detected in sampled collected from soil gas probes throughout the SDDL site.

1.2.1 GEOLOGY, HYDROGEOLOGY, TOPOGRAPHY

The Dayton area is located within the buried pre-glacial valley system that underlies the present day GMR and its tributaries in southwestern Ohio. This pre-glacial valley system is knows as the Miami Valley Aquifer System. The regional overburden geology of the Dayton area consists of glacial tills and glaciofluvial sand and gravel deposits. Norris and Spieker (1966) defined the overburden units, based on general character and relative position as follows (from top to bottom):

> Ground Moraine (glacial till) – composed of silt, gravel and clay; found primarily in the uplands areas (not present at the Site);
>
> Upper Aquifer Zone – the saturated glaciofluvial sand and gravel zone located above a major till-rich zone;

Till-Rich Zone – composed of discontinuous fine-grained glacial till and other fine-grained materials with substantial components of sand and gravel;

Lower Aquifer Zone – the glaciofluvial sand and gravel zone located beneath the Till-Rich Zone.

The subsurface geology in the vicinity of the SDDL site consists of fill and waste underlain by glacial tills, and glaciofluvial sand and gravel deposits.

Norris and Spieker (1966) identified three principal hydrogeologic units in the Dayton area, as follows:

Upper Aquifer Zone – the upper portion of the saturated glaciofluvial sand and gravel facies;

Till-Rich Zone – a zone of discontinuous, low permeability till facies interspersed with sand and gravel facies which act as an aquitard in some areas;

Lower Aquifer Zone – the lower portion of the saturated glaciofluvial sand and gravel facies.

The subsurface hydrostratigraphy in the vicinity of the SDDL site is consistent with the regional geology of the Miami Valley Aquifer System with the exception that the Till-Rich Zone is highly discontinuous beneath the SDDL site. Monitoring wells installed on the SDDL site are screened in sand and gravel deposits above approximately 675-ft above mean sea level (AMSL). These deposits appear to be representative of the Upper Aquifer Zone. Monitoring wells screened below 675 ft AMSL appear to be representative of the Lower Aquifer Zone. Due to the stratigraphic variation of the Till Rich Zone both vertically and laterally, the implied 675 ft AMSL boundary between the Upper and Lower Aquifer Zones is approximate and may vary in elevation across the Site.

Groundwater flow in the Upper Aquifer Zone is influenced by the presence of the GMR to the north and west of the Site. Shallow groundwater (i.e., Upper Aquifer Zone) typically flows radially towards the GMR. However, during extended periods of high flow in the GMR, groundwater flow slightly to the southeast has been documented.

Basically, the stage of the GMR determines whether it is a gaining (effluent) or losing (influent) stream. For example, during flood events, groundwater flow is occasionally reversed and migrates from the GMR to the Site and the SSDL site.

Groundwater flow in the Lower Aquifer Zone is predominantly to the southwest in the area, with occasional slight southeasterly components, and is not significantly affected by the GMR. However, in areas where the intermediate till rich zone is absent, the upper and lower aquifer are in direct communication and the stage of the GMR will affect the flow in the lower aquifer zone. The groundwater level elevation in the vicinity of the Site is reported to between 700 and 725 AMSL at the Site.

A heavily vegetated man-made embankment is present along the northern and western boundary of the Site, along the GMR. The grassy area between the berm and the GMR is part of the 100-year floodway and is owned by the MCD. The topography of the Site is fairly level, due to grading activities. The largest stockpile, a recycled asphalt product (RAP) pile, rises approximately 40-feet above the ground surface. A paved roadway provides access from Dryden Road and along the northern portion of the Site. A majority of the Site's land surface is covered with stockpiles of raw materials.

The topography of the SDDL site is variable with embankments along the Great Miami Recreational Trail, an unpaved access road, a depressed area, several mounded areas of fill, a ravine and a low-lying area along the entire southern portion of the SDDL site.

1.3 SITE HISTORY

From 1941 until 1993 various members of the Boesch and Grillot families owned the Site (and to the present own a majority of the SSDL site) where dumping was conducted. The majority of the properties that comprise the SDDL site were acquired over time by Horace Boesch and Cyril Grillot.

The landfill operated from the early 1940s to 1996 and is partially filled sand and gravel pit. The landfill contains household waste, drums, metal turnings, fly ash, foundry sand, demolition material, wooden pallets, asphalt, paint, paint thinner, oils, brake fluids, asbestos, solvents, transformers and other industrial materials known to have been brought to the SDDL site. As the excavated areas of the SDDL site were filled, some of the property was sold and/or leased to businesses along Dryden and East River Roads. Valley purchase Parcel 5054, consisting of approximately 10– acres, in 1993. The Miami Conservancy District owns the southern part of the SDDL site.

Disposal of waste materials began at the SDDL site in the early 1940s. Materials dumped at the SDDL site included drummed wastes. Known hazardous substances were brought to the SDDL site, including drums containing hazardous waste from nearby facilities. Some of the drums contained cleaning solvents (1,1,1-triochloroethane [TCA], methyl ethyl ketone [MEK], and xylenes); cutting oils; paint; Stoddard solvents; and machine-tool, water based coolants. The SDDL site previously accepted materials including oils, paint residue, brake fluids, chemicals for cleaning metals, solvents, etc. Large quantities of foundry sand and fly ash were dumped at the SDDL site. Asbestos was also reportedly dumped at the site.

USEPA conducted a screening site inspection of the SDDL site in 1991. OEPA conducted a site team evaluation prioritization of the landfill in 1996. In 2002, USEP conducted an aerial photographic analysis of the SDDL site.

In 1991, four underground storage tanks (USTs) were removed from the Site. Two 4,000-galon steel USTs contained waste oil and gasoline, respectively. Two 3,000-gallon USTs contained diesel and kerosene, respectively.

In 2000, Valley Asphalt removed five drums containing characteristic hazardous waste, PCBs and VOCs and 2,217 tons of contaminated soils from the northern area of the Site that were uncovered during the excavation for a sewer line.

USEPA proposed the SDDL site to the National Priorities List (NPL) in 2004. In 2008 to 2010, others completed several investigations at the SDDL site, including geophysical surveys, test pit and test trench sampling, vertical aquifer sampling, landfill gas sampling and groundwater monitoring well installation and sampling. From these investigations, the USEPA determined that the groundwater beneath portions of the

SDDL site contains vinyl chloride, TCE, 1,2-DCE, arsenic, lead and other chemicals. Based on the investigations, the remedial work to be completed on the SDDL site was divided into two parts. The remedial strategy for Operable Unit One (OU1), which is shown on Figure 1.2, is expected to involve evaluating cleanup alternatives to address 55-acres of the landfill. Valley's Site lies within OU1 and the cleanup alternatives that are being considered will allow Valley to remain operating safely. In 2012, USEPA, in consultation with OEPA, determined that additional data must be collected on groundwater and potential hot spots before selecting a remedy for OU1. Additional investigation and remedy evaluation is ongoing.

1.3.1 SITE HISTORY –VAPOR INTRUSION SAMPLING

Exterior Sampling Activities

In 2009 and 2010, others collected soil vapor samples from three permanently-installed soil vapor probes located on the Valley Site. Each soil vapor probe was located in exterior areas (as opposed to interiors of buildings). The samples were submitted to an accredited laboratory and analyzed for VOCs by USEPA Method TO-15. Others compared the soil vapor sample results to generic soil vapor screening levels that were derived by applying the USEPA Region 5 Guidance (USEPA, 2010) default soil gas-to-indoor air attenuation factor of 0.1 to the USEPA indoor air regional screening levels (RSLs). The VOCs detected in soil vapor samples at concentrations greater than the generic soil vapor screening levels were 1,1-dichloroethane (DCA); 1,1-dichloroethene, benzene; chlorobenzene; chloroform; cis-1,2-DCE; ethylbenzene; naphthalene; tetrachloroethene (PCE): TCE; vinyl chloride, trichloroethene, and total xylenes. Exceedances of the generic soil vapor screening levels occurred at all three of the Valley Site soil vapor probes.

Others completed field screening for methane at the exterior soil vapor probes in 2009. The soil vapor methane concentrations were compared to the upper explosive limit (UEL)(15 percent methane) and Lower Explosive limit (LEL)(5 percent methane) for methane. Methane concentrations were greater than 10 percent of the LEL (O.5 percent methane) at all three of soil vapor probe locations on the Valley Site.

Interior Sampling Activities

The USEPA and others conducted vapor intrusion sampling in 2012; these investigations documented that vapor intrusion is occurring at the Valley Site.

In the unoccupied storage building, Building #2 located at 1903 Dryden Road, methane was detected in a laboratory sub-slab sample at 6.6 percent, which is greater than 100 percent of the LEL. Based on field data, methane was not detected in the indoor air. This building is currently closed to access. On January 9, 2012, email notification was provided to USEPA and the OEPA pertaining to explosive gas field readings from the sub-slab soil vapor probe. On January 10, 2012, in accordance with OAC 3745-27-12, representatives of the Public Health - Dayton and Montgomery County (PHDMC), the City of Moraine Fire Division[2], and the Moraine Police Division were notified via telephone of the exceedance of the LEL. On January 11, 2012, letters were issued via email to the above-mentioned agencies, providing written notification of the exceedance of the LEL. Others manually measure the indoor air and sub-slab methane concentrations at this building on a weekly basis to ensure that methane concentrations do not increase and that methane is not migrating from beneath the slab into the building. On January 24, 2013, one Sierra Gas monitor (model 2001) was installed in Building #2.

Four of the Site's buildings (Buildings #1, 2, 4 and 5) showed sub-slab TCE levels greater than the ODH screening level of 20 parts per billion by volume (ppbv), with a high TCE concentration of 2,700 ppbv. One of these four buildings showed indoor air TCE levels greater than the ODH screening level of 2 ppbv, with a high TCE concentration of 8.1 ppbv. This documents a completed exposure pathway for the building.

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2 When the Respondents originally telephoned the Moraine Police Division on January 10, 2012, the Moraine Police directed the Respondents to report the issue to an individual with the City of Moraine Fire Division. Respondents reported the issue to a representative of the Moraine Police Division on January 11, 2012

In addition, sub-slab benzene levels associated wit h Building 2 showed levels greater than the ODH sub-slab benzene screening lev el of 20 ppbv and the vinyl chloride screening level of 20 ppbv.

The maximum sub-slab and indoor air concentrations that were greater than the ODH screening levels for each building are presente d on Figure 1.3. A copy of the March 2013 USEPA Removal Order is included as Appendix A.

2.0 SITE MOBILIZATION

2.1 HEALTH AND SAFETY PLAN

A Health and Safety Plan (HASP) has been establish ed for this Site and is included in Appendix B. The HASP is a "living docu ment" and procedures will be updated if additional information is discovered which requires alteration of the plan.

Site control measures are addressed as Section 5.11 of the HASP.

At the current time, no central facility has been e stablished for team communications and emergency response. Sanitary fa cilities (i.e., Porta-Potty) are available near Building 4. A map to the hospital i s posted on the inside of the primary man-door leading into Building 4. A first aid kit is available in Building 4. If established, a central facility will be available f or meetings and emergency response. No potentially contaminated personnel or materials wil l be allowed in this facility. If the central facility is established, Valley will provid e sets of keys (central facility key) to the facility to USEPA and USEPA START (contractor). Valley will also provide a Gate Key to USEPA and USEPA START (contractor).

2.2 PRE-WORK MEETING

A pre-work meeting will be held between Valley, USE PA On-Scene Coordinator (OSC), ODH Licensed Radon contractor, and the other contractors to discuss this work plan, once approved by USEPA. All participants wil l read and formally acknowledge the provisions of the HASP before initiating on-Site wo rk. The following topics may be discussed in detail: provisions for Site security, mobilization, emergency procedures, delegation of responsibilities, and channels communication.

2.3 EMERGENCY PROCEDURES

Emergency procedures have been established for this Site. Emergency procedures provide specific guidelines and establis h procedures for the protection of personnel in the event of an emergency. The emerge ncy procedures included as Section 5.8 – 5.10 of the HASP.

3.0 SAMPLING ACTIVITIES

To be submitted at a later date.

4.0 MITIGATION PLAN

One of the primary objectives of the VI Mitigation Activity is to design and install a vapor abatement mitigation system in on-Site non -residential (i.e., commercial) structures impacted by subsurface gas mitigation, i f the concentration(s) of COC(s) exceed ODH sub-slab or indoor air screening levels and the presence of the COC(s) is determined to be a result of vapor intrusion. Sect ion 4.6 presents a summary of all buildings sampled during the VI Investigation and t he associated mitigation decisions. The "Mitigation Summary Database" Excel file used to track the progress of mitigation is a living document, and the version current as of th e date of Work Plan, is included as Appendix C. This document will be updated as neede d throughout the VI Mitigation Activity in order to reflect the status of the mitigation and any new information received.

Valley has tentative plans to demolish Building 1, the brick front office space associated with Building 2 and the MP Building. Therefore, Valley will focus mitigation activities on the storage area (Quonset hut) associated with Building 2, Building 4 and Building 5. Mitigation activities are not planned for Building 6, which has an earthen floor; only monitoring will take place.

Beginning on May 2, 2013, USEPA, USEPA START contractor, Valley and Bowser Morner will participate in weekly update conference calls regarding the Mitigation Summary Database and next steps. Appendix E presents the meeting agenda and meeting minute templates for the weekly conference calls.

The abatement system will include installation of a SSDS or crawl space depressurization system (CSDS), sealing cracks in walls and floors of the basement or lowest building floor, and sealing drains that could be a pathway. Structures with sub-slab methane concentrations greater than 5 percent by volume will require an intrinsically safe SSDS. Active SSDS will be designed and installed in the specified buildings to reduce potential indoor air inhalation issues. This is achieved by creating a lower air pressure beneath the floor slab than above the floor slab. The Respondents will work closely with an ODH Licensed Radon Contactor who will be responsible for ensuring proper installation and operation of the systems. The scope of the work for the SSDSs will include:

Task 1 – Conduct a building inspection / engineering evaluation.

Task 2 – Design SSDS and submit designs USEPA for approval.

Task 3 – Install SSDS

Task 4 – Develop a Mitigation Performance Sampling Plan

Task 5 – Perform Proficiency Sampling and Annual Inspections/Maintenance.

4.1 TASK 1 – CONDUCT BUILDING INSPECTION AND ENGINEERING EVALUATIONS

Valley will review and confirm building plans and blueprints, if available, and conduct pre-design building inspections. This will include evaluation of the building layouts and construction components including HVAC, electrical and structural. Of particular interest are the building foundations, sub-slab layouts and orientations including materials of construction, utility connections and conduit layouts for future design purposes. Sealing of cracks may be completed at this stage, if appropriate.

4.2 TASK 2 – DESIGN SUB-SLAB DEPRESSURIZATION SYSTEM

The information obtained from the Building Physical Survey and sub-slab probe installation(s) will be used to prepare conceptual layout design drawings. The system design will include the number and location of suction points, pipe routing, discharge point(s), fan location(s), and fan sizing. The basic design requirements will be prepared to a level acceptable for use for contractor bidding purposes. One or more contractors will participate in inspections of the buildings or, at the contractor's discretion, will agree to rely on inspections of the buildings completed by others. Following the building inspections, the contractor will prepare a Design Plan, which, after it is approved by Valley and Bowser Morner, will be submitted USEPA. The designs will be based on industry standards, local code, and manufacturer information regarding equipment performance for an active depressurization system. Following receipt of USEPA approval, the contractors will proceed with the installation.

Following completion of the installation, a Mitigation System As-built Report will be submitted to USEPA. This Mitigation System As-built Report will be included in the O&M manual. These reports will contain the following information:

- Data from the vacuum-radius of influence testing, including sub-slab vacuum and flow measurements

Figure(s) showing the number of extraction locations and performance monitoring points

Figure(s) showing the route of the discharge piping system(s) and the location of the exhaust fan(s) for each building

Identification of materials and equipment used for each system (piping, blower, sizing, vacuum monitoring, valving, etc.)

Procedures for startup and performance testing following system installation.

Operational goals and objectives including radius of influence and vacuum field monitoring point vacuums

An intrinsically safe system will be installed at properties which have methane beneath the sub-slab greater than five percent by volume.

A visual inspection will be completed to verify that no air intakes have been located near the proposed exhaust discharge point(s).

Following receipt of approval of the mitigation system design by USEPA, Valley will solicit contractor proposals, and undertake contractor procurement. As noted above, the contractor will be a licensed ODH Licensed Radon Contractor. In the event that a design-build approach is adopted, Valley will solicit contractor proposals prior to commencing the design and will commence installation of the SSDS following receipt of approval from USEPA.

4.3 TASK 3 –

INSTALL THE SSDS

The SSDS in each building may consist of multiple vapor recovery points. Either fan(s) or larger blower(s) connected to extraction point(s) will be installed outside the building, mounted directly on the system piping and fastened to a supporting structure by means of mounting brackets. The fan(s) or blower(s) will operate continuously to pull a vacuum from the vapor recovery point(s). The vapors will discharge to the outdoor air above the building roof. This will allow any VOCs present to dissipate more readily. As methane is lighter than air, discharging the gases above the roof top ensures that any methane that may be present will not create a localized explosion hazard near the ground surface where potential ignition sources could ignite it. A sample port and an air-velocity monitoring access point will be installed in the discharge pipe at least two feet away from any constrictions (i.e., bends, elbows, etc.) and after (i.e., above) the fan. A common external fuse panel will be considered to power the SSDS system(s). All exterior electrical panels must be weatherproof, must provide an uninterruptable power source, and be secured with a lock and tamper-proof box. Equipment used to install the SSDS beneath buildings where explosive gases are present in the sub-slab vapor at concentrations greater than 10 percent of the LEL or where no sub-slab explosive gas data are available will be intrinsically safe, because of potential explosive hazards.

Permanent vacuum monitoring points will be installed for each system, on the suction side of the fan. A permanent vacuum gauge will consist of a “U-tube” manometer, or similar device, with a minimum vacuum of 1 inch of water. The permanent vacuum monitoring points will document that the sub-slab beneath the entire building has been depressurized. The Respondents will verify that manometer vacuum is in the range of 1 or 4 inches of water ("w.c.”), and will mark the operating vacuum on the manometer. The vacuum will be set to the minimum required to depressurize the entire slab and is expected to be in the range of 1 or 2" w.c. It is possible that vacuums of approximately 4" w.c. may be required to be applied in some suction points in order to achieve a negative vacuum across the entire slab. The number of vacuum monitoring points will be determined during the design process.

Following the installation of the SSDSs, the radius of influence of each system will be checked using a digital manometer to determine if a vacuum is applied across the entire building slab. The digital manometer can be used at the sub-slab soil vapor probe locations, provided that they are located on opposite sides of the slab from the suction point. Additional sub-slab depressurization points and monitoring points can be installed if the resulting vacuum proves insufficient or more monitoring points are required.

USEPA 2008 guidance document titled "Indoor Air Vapor Intrusion Mitigation Approaches" states that the generally accepted target range for depressurization is 4 to 10 pascals or 0.0161 to 0.04" w.c., with a nominal continuous operating range of depressurization from 0.025 to 0.035" w.c. for standard permeability sub-slab material. However, differential pressure ranges as low as 0.001" w.c. are sufficient to effectively depressurize a sub-slab, according to USEPA 1993 guidance "Radon Reduction Techniques for Existing Detached Houses: Technical Guidance for Active Soil Depressurization Systems.

If the digital manometer shows a vacuum reading of negative 0.004" w.c. below the slab, then there are sufficient indications that the active system is successfully depressurizing the sub-slab area across the footprint of the building. During the operation and monitoring of the SSDSs, Bowser Morner will compare the vacuum measurements to the appropriate ranges, and if necessary, make adjustments to the SSDSs.

The following information will be recorded to define the operating performance of the SSDSs:

- Location of the sub-slab sample points
- Initial sub-slab pressure field measurements
- Static pressure at each permanent vacuum monitoring point (U-tube manometer readings)
- Static pressure at the fan inlet
- Photos of the SSDS header and fan

Valley periodically will check the system components following completion of system installations. If Valley notices damage to the SSDS or the system is not functioning within the range marked on the permanent vacuum monitoring points, they will call a Bowser Morner contact. Labels on the system components will list a telephone number for a Bowser Morner contact.

Any gaps around the extraction point penetration an d utility penetrations through the foundation floor will be appropriately sealed. Other opening and cracks in the foundation will be sealed where necessary and feasible.

As specified in Section 3.2.2 above, Bowser Morner will collect an effluent air sample from the extraction pipe of the building wit h the greatest sub-slab TCE concentration (i.e.: Building 1) on an annual basis. The effluent air sample results will be compared to State of Ohio de minimis levels, docume nted in OAC 3745-15-05, to determine if off-gas treatment is required.

4.4 TASK 4 – DEVELOP A MITIGATION PERFORMANCE SAMPLING PLAN

To be submitted at a later date.

4.5 TASK 5 - PERFORM PROFICIENCY SAMPLING AND ANNUAL INSPECTIONS/MAINTENANCE

4.5.1 MAINTENANCE OF THE SSDS

A general operation, maintenance, and monitoring (O M&M) plan will be completed within 60-days of system start-up. The O M&M plan will detail activities required to operate the SSDS, perform repairs, and a guideline to evaluate the effectiveness of system operations. The contents of the OM&M manual will include, but not be limited to:

Operator’s manual for the system

Contact information sheet

System life expectancy

Fan warranty information

Baseline sample results (30- and 180-days and Annual sampling rounds)

Proficiency sample results

Annual inspection log sheets

Photographic documentation

Mitigation Acceptance Letter

Mitigation System As-built Report (including map of system)

Key to the padlock to turn the system "on" and "off"

The general OM&M plan will include an appendix containing any system-specific information required for each building. The OM&M plan will be placed in binders to allow for easy updating of any required information and kept on-site.

The SSDS maintenance program consists of an inspection and repair program for the system components. Valley will conduct a semi-annual inspection of the SSDS in the first year of operation, and annually thereafter, to ensure proper functionality. The inspection program will include visual inspections of the SSDSs for deficiencies to verify that the system components are effectively performing their intended functions. The following forms, provided in Appendix F, will be included in the OM&M Plans:

Inspection checklist

Inspection Log

Repair Log

4.5.2 MONITORING PROGRAM

Valley will complete a system startup monitoring program to document that the sub-slab beneath the entire area of concern in each building has been depressurized. The system startup monitoring will consist of monitoring and recording the vacuum at each of the vacuum monitoring points in each building using a digital manometer immediately following start-up.

To verify that the mitigation systems are operating to reduce indoor air concentrations of VI contaminants to less than applicable criteria, Valley will complete post-installation proficiency air sampling as discussed in Section 3.2. The Respondents will collect indoor air samples from all locations with an installed vapor abatement mitigation system, (listed in Section 3.2), 30 days, 180 days, and 1 year, following system installation. The Respondents will also complete radius of influence testing at the same time as the indoor air sampling. If ODH screening levels are exceeded, the Respondents will submit a Corrective Action Plan to USEPA within 30 days. The Respondents will complete indoor air sampling at a subset (20 percent of operating systems and approved by USEPA prior to scheduling) of the buildings at a frequency of every year from SSDS installation, provided the SSDS is still required. Proficiency air sampling will continue until USEPA notifies the Respondents that work is complete. The Respondents will provide the results and corresponding evaluation after each sampling event to USEPA within 30 days of receiving the complete set of final analytical data.

To verify that the mitigation systems are operating to reduce sub-slab concentrations of VI contaminants beneath the slabs associated with demolished buildings to less than applicable criteria, Valley will complete post-installation proficiency air sampling as discussed in Section 3.2. Valley will collect sub-slab samples from all three locations with an installed vapor abatement mitigation system (listed in Section 3.2) 30 days and annually following system installation, provided the SSDS is still required. Valley will also complete radius of influence testing as the same time as the sub-slab sampling. If ODH screening levels are exceeded, Valley will submit a Corrective Action Plan to USEPA within 30 days. Proficiency air sampling will continue until USEPA notifies Valley that work is complete. Valley will provide the results and corresponding evaluation after each sampling event to USEPA within 30 days of receiving the complete set of final analytical data.

4.5.3 ANNUAL SSDS INSPECTIONS

Valley will complete annual performance inspections on all SSDS installed to ensure that they are functioning properly. System performance inspection activities will include, but are not limited to:

System vacuum / pressure readings will be checked to ensure the system is operating in the design range

Sub-slab pressure field readings will be measured at permanent sub-slab sample points to ensure sub-slab depressurization is negative (for buildings with active SSDS and slab foundations)

Visual inspection of system piping and components for damage

Inspection of floor and wall seals, and seals around system piping penetrations, including checks for any additional areas requiring sealing

Confirm operation of the blower fan, including checks for unusual noise or vibration

Confirm padlock is attached to the on / off switch

Confirm operation with tenants and inspection to determine if there have been any spills, releases, and/or operational changes that may influence the need for system operation

A copy of the Annual SSDS Inspection Form is included in Attachment F.

4.6 VI INVESTIGATION BUILDING MITIGATION SUMMARY

In 2012, others completed vapor intrusion investigations of buildings on Valley Asphalt's Property (1901 and 1903 Dryden Road, Parcel 5054). The six buildings that were investigated are shown on Figure 4.1. In accordance with the Mitigation Summary Database Excel file, current as of the date of this report, of the six buildings investigated:

Three structures are proposed for demolition, pending a final decision by Valley.

Three buildings will require a SSDS. One building requires no further action.

5.0 SYSTEM DECOMMISSIONING / PROJECT CLOSE-OUT ACTIVITIES

Criteria to determine when it is appropriate to cease operation of individual vapor SSDSs will be decided at a future date.

5.1 ABANDONMENT OF GAS MONITORING PROBES

In the event that a gas monitoring or sub-slab soil vapor probe becomes damaged, plugged, or otherwise rendered unusable, or alternatively at the completion of all explosive gas monitoring requirements, the respective gas probe(s) will be abandoned in accordance with the procedures stipulated in OAC 3745-9-10. Such abandonment will consist of filling the gas probe(s) with a non-shrinking grout or over-drilling the sub-slab probe(s) and filling it with cement, to mitigate the infiltration of surface waters. No gas monitoring probes will be abandoned without prior authorization from USEPA. If a damaged, plugged, or otherwise unusable probe is still required for monitoring sub-slab soil vapor conditions at a particular location, the Respondents will replace the probe following the procedures documented in Section 3.4.

6.0 PROJECT MANAGEMENT

6.1 RESPONSIBILITIES AND FUNCTIONS

The companies and individuals who will be responsible for the various aspects of the work are detailed in the organizational chart on Figure 7.1.

Contact numbers for each member are provided in the following table.

Contact Name	Phone #
Steven Renninger (U.S. EPA OSC)	513-260-7849
Leslie Patterson (U.S. EPA RPM)	312-886-4904
Laura Marshall (Ohio EPA)	937-285-6452
John Sherrard (Dynamac Corporation, USEPA START contractor)	513-703-3092
Mark Case (Pubic Health – Dayton / Montgomery County)	937-225-4429
Bob Frey (ODH)	614-466-1069
Katherine Beach (Bowser Morner)	937-236-8805, ext. 340 937-308-1694 (cell)
Jeff Arp (Bowser Morner)	937-236-8805, ext. 258 614-419-0414 (cell)

7.0 PROJECT SCHEDULE

Task	Schedule
Weekly Mitigation Status update conference calls with USEPA and Respondents	Thursdays at 3:00 pm
Work Plan Due Date	10 days from the AOC Effective Date AOC Effective Date is April 16, 2013 Due Date is April 26, 2013
Revised Work Plan Due Date	Anticipated May 15, 2013
Written notification to USEPA of new contractors and/or subcontractors	At least 5 days prior to commencement of Work
Initiate Section 4.1 tasks	Within X days of Work Plan approval
Conduct building inspections / engineering evaluations	Anticipated date: May 15, 2013
Design sub-slab depressurization system	Within X weeks of completion of building inspection / engineering evaluation and Ohio licensed radon subcontractor procurement
Install SSDS	Within X weeks of completion of design of sub-slab depressurization system
Develop Mitigation Performance Sampling Plan	Within X weeks of installation of sub-slab depressurization system
Monthly Progress Reports	30 days after approval of Work Plan, until termination of ASAOC
Oral notification of any delay in performance of UAO Obligations	Within 24 hours

Task	Schedule
Written notification of any delay in performance of UAO obligations	Within 7 days thereafter
O&M Manual submission to USEPA	Within 60 days of SSDS start-up
Annual SSDS Inspections	Complete within 30 days of determination of schedule (annually thereafter)
Proficiency indoor air sampling (new SSDS installations)	30, 180, and 365 days post-installation
Proficiency air sampling (sub-set of systems)	Beginning 2 years following SSDS installation
Submission of Corrective Action Plan	Within 30 days of receiving indoor air sampling results that are greater than ODH screening levels
SSDS Upgrades	Within 30 days of receiving validated proficiency air sampling analytical results
Indoor air proficiency sample following completion of SSDS Upgrades (if required)	Within 30 days of completion of system modifications
Provision of analytical results and corresponding evaluation to USEPA following each sampling event	Within 30 days of receiving the complete set of final analytical results
Final Report summarizing actions completed to comply with UAO	Within 60 days of completion of all work specified in Section V of the UAO (i.e., following completion of proficiency indoor air sampling for new SSDS installations)

APPENDIX A

UNILATERAL ADMINISTRATIVE ORDER

APPENDIX B

HEALTH AND SAFETY PLAN

APPENDIX C

MITIGATION SUMMARY DATABASE

APPENDIX D

COMPLETED BUILDING PHYSICAL SURVEYS FOR BUILDINGS REQUIRING MITIGATION

APPENDIX E

USEPA / VALLEY MEETING AGENDAS & MINUTES

APPENDIX F

OM&M PLAN FORMS

ATTACHMENT 1

BUILDING PHYSICAL SURVEY QUESTIONNAIRE

ATTACHMENT 2

INSPECTION CHECKLIST

ATTACHMENT 3

REPAIR LOG

FIGURES